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PRESSURE SOURCE OF A DRIVE MEDIUM OF A POSITIVE
DISPLACEMENT PUMP
[Istochnik davleniya privodnoy sredy
obyemnogo nasosa]

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The invention relates to mechanical engineering of hydraulic machinery, to pressure sources of a drive medium, and can be used in various branches of the economy for driving positive displacement pumps which are used for example to pump water out of a water source.

A pressure source of the drive medium of a positive displacement pump is known which contains a distribution device, a solution-filled working chamber and a tank with a solvent which has a semipermeable membrane for communication with the working chamber [1].

The defect of the known pressure source is low efficiency due to the necessity of periodically renewing the solution.

The object of the invention is to increase the efficiency of operation.

To achieve this object the source is equipped with a second tank with a semipermeable membrane and a solution of higher concentration than the solution in the working chamber, and the latter is in communication with the tank with the solution and the solvent through the distribution device.

Figure 1 shows a diagram of the pump with the proposed pressure source; Figure 2 shows a diagram of the distribution device.

The pressure source of the drive medium of the positive displacement pump 1 contains a distribution device 2, a solution-filled working chamber 3 and a tank 4 with a solvent which has a semipermeable membrane 5 for communication with the working chamber 3. Moreover the source is equipped with a second tank 6 with a semipermeable membrane 7 and a solution of higher concentration than the solution in the working chamber 3, and the latter is in communication with the tanks 4 and 6

* Numbers in the margin indicate pagination in the foreign text.

for the solution and the solvent through the distribution device 2. The tanks 4 and 6 are mounted in a solar distiller 8 which has a transparent tilted cover 9. The working chamber 3 of the pressure source is separated from the pump chamber 10 of the pump 1 by a flexible separating element 11, for example a bellows. In the pump chamber 10 of the pump 1 is a flexible control element 12 with a chamber 13 in communication with an actuating chamber 14 of the distribution device 2 which has stop valves 15 mounted on the various arms of a rocker 16. The pump chamber 10 is equipped with intake and delivery valves 17 and 18 respectively. /2

The device operates as follows.

In the evaporator under the action of solar radiation the solvent, for example water from the solution which fills the tank 6, is vaporized and condenses on the cover 9. The condensed water flows out along the tilted cover 9 into the tank 4 where the solvent also accumulates. The indicated cycle is closed.

When the working chamber 3 is connected via the distribution device 2 to the tank 4 with the solvent, the latter enters the working chamber 3 due to the gradient of osmotic pressures on the different sides of the semipermeable membrane 5. The volume of the chamber increases and the flexible separating element 11 displaces the medium being pumped from the pump chamber 10 through the valve 18 to the consumer. As a certain pressure is reached in the pump chamber 10, the distribution device 2 with some time delay which is caused by the overflow of the control medium from chamber 13 into chamber 14 is switched to the other position in which the working chamber 3 is in communication with the tank 6 for the solution with a higher

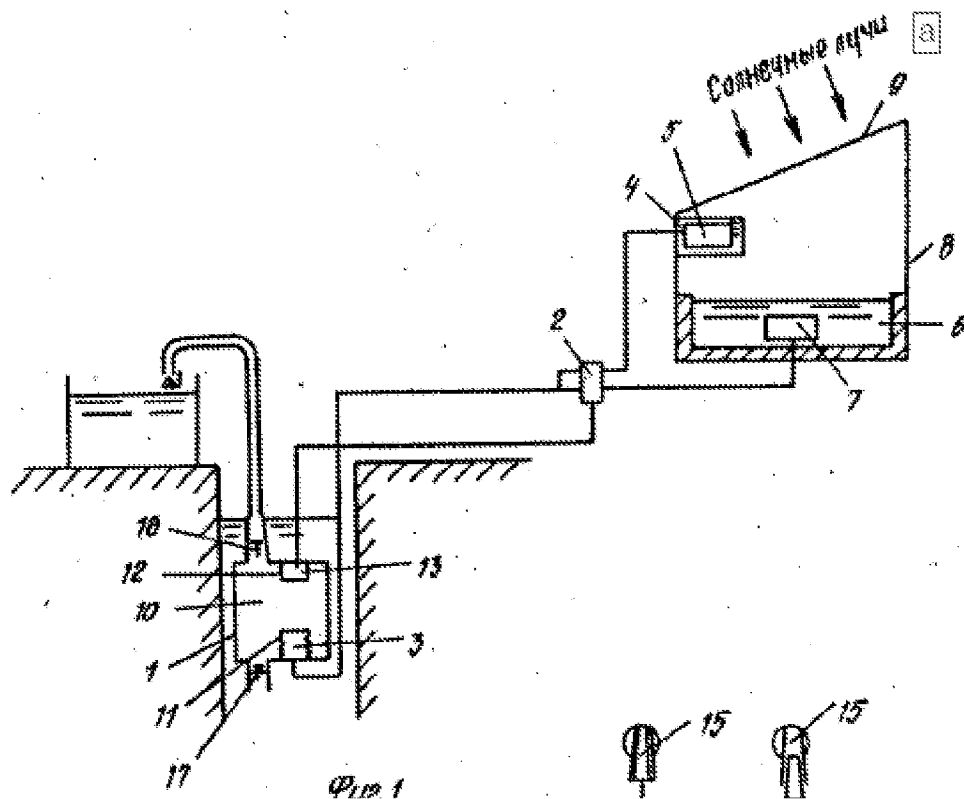
concentration. Due to the gradient of osmotic pressures on the semipermeable membrane 7 the solvent from the less concentrated solution in the working chamber 3 travels into the tank 6. The volume of the working chamber 3 decreases, and a new batch of the liquid being pumped travels into the pump chamber 10 through the intake valve 17. The pressure in the chamber 10 drops, and as a certain time passes the distribution device 2 returns to the initial position. Then the operating cycle repeats.

Due to the fact that a completely closed operating cycle is implemented in the device, the efficiency of its operation increases.

Claim

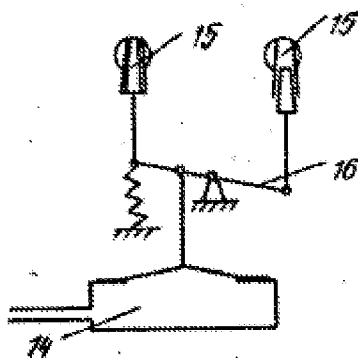
Pressure source of the drive medium of a positive displacement pump which contains a distribution device, a solution-filled working chamber and a tank with a solvent which has a semipermeable membrane for communication with the working chamber, characterized in that in order to increase the efficiency of operation it is equipped with a second tank with a semipermeable membrane and a solution of higher concentration than the solution in the working chamber, and the latter is in communication with the tanks with the solution and the solvent through the distribution device.

Figure 1



Key: a) solar radiation

Figure 2



Sources of information considered in the evaluation
 1. U.S. patent no. 3587227, cl. 60-1, 1971